

## **CHAPTER 2**

### **DRAWING REQUIREMENTS**

## **2.1 Sanitary Sewers**

### **2.1.1 General**

Plans submitted to the LFUCG shall include all information necessary to evaluate the proposed design. A comprehensive plan of existing and proposed sewers shall be included for projects involving new sewer systems and/or additions to existing systems.

### **2.1.2 Geographical Features**

All geographical features shall be shown. Topography and elevations of all existing and proposed streets, streams, or water surfaces shall be shown. Contour lines shall be at 2-foot intervals.

The direction of flow in all streams, high and low water elevations of all water surfaces near the sewers shall be shown. 100-year flood elevations shall be shown. The boundaries of the proposed development shall be shown.

### **2.1.3 Plan and Profile**

Plans shall show the location size and direction of all proposed and existing sewers. Plan sheets and profile sheets shall be at a scale no smaller than 1 inch = 50 feet horizontal, and 1 inch = 5 feet vertical.

### **2.1.4 Manholes**

Manhole numbers, manhole stations, deflection angles, and coordinates of manholes shall be shown on the plans.

### **2.1.5 Lines**

The distance between manholes, pipe size, and slope shall be shown on each line segment.

### **2.1.6 Elevations**

Elevations shall conform to the LFUCG datum and be shown at all manhole inverts, tops of manhole and other places as necessary to define the design intent.

### **2.1.7 Utilities and Easements**

The plans shall show all existing utilities and structures, both above and below ground which might interfere with the proposed construction. Easements and locations of all proposed utilities shall be shown on the plans. Refer to 6.9 Easements for additional information.

### ***2.1.8 Miscellaneous***

Legends, vicinity map, north arrows, and any other information required for a complete set of sanitary sewer drawings shall be submitted.

### ***2.1.9 Plans Submitted***

After submittal to and approval by the State Division of Water one (1) set of the state-approved plans shall be returned to the LFUCG. Record Drawings shall be submitted in accordance with that section of this manual.

### ***2.1.10 Checklists***

Checklists to be submitted with the plans are included at the end of Section 2.

## **2.2 Pumping Stations**

### **2.2.1 General**

The LFUCG has developed standard Class C and D pumping station drawings on AutoCAD Release 14 to provide guidelines for the preparation of design plans. These drawings are intended to show the requirements for Class C and D pumping stations and the type of information that is required on the plans. These drawings are not intended to be used in a “cook book” fashion or to minimize the role and/or the responsibility of the Engineer. The Engineer has the ultimate responsibility for the design.

The pumping station shall be designed to meet or exceed the requirements of all Federal, State and Local laws and ordinances, and applicable design standards recommended by the Ten State Standards.

### **2.2.2 Vicinity Map**

Show existing pump stations, force mains, and trunk sewers within a 1-mile radius of the proposed station. Also, indicate the size and minimum grade of the gravity sewer receiving the discharge of the proposed station.

### **2.2.3 Site Plan**

The site plan shall show the following:

- Topographic features and contours
- Location of station relative to existing features and survey base lines as needed
- Existing and proposed utilities
- Existing and proposed property lines and easements
- Bench marks (must tie into LFUCG datum)
- Known high water and/or projected maximum flood elevations (100 year frequency)
- Access road, parking, turn-around, regrade and drainage
- Subsurface information, as appropriate
- Fencing
- Landscaping when required

### **2.2.4 Detailed Plan Sheets**

Provide sufficient plan, section and elevation views to indicate the intent of what is to be furnished.

### **2.2.5 Elevations**

Specific elevations shall be indicated for the following items:

- Vent (above high water and regrade)

- Overflow invert
- Sewer influent invert
- Top of wet well top slab (above regrade)
- Pump start
- Pump stop
- Second pump start
- High water level alarm
- Top of foundation slab
- Regrade
- Top of valve pit

### **2.2.6 *Miscellaneous Plan Details***

The following details shall be included on the drawings:

- Manholes and castings
- Pump station and valve covers
- Locking device for wet well and pump station covers shall be hasp and keeper for padlock. Padlock to be furnished by Urban County Government
- Piping connections
- Electrical details, including service pole with weather-tight, lockable, disconnect switches and control boxes
- Pump station and wet well protection - fenced as directed by Division of Water Quality

### **2.2.7 *Specifications and/or Drawings***

The following items shall be shown as details on the drawings and/or included in the specifications:

- Lights - Outside on service pole
- Fence - Chain Link, Farm type or other as necessary to match surrounding area
- Paving - Drives and Turnarounds
- Pump Control Panels - For lead/lag duplex pump operation
- Telemetry System - To operate with existing telemetry system
- Spare Parts - Volute gaskets, mechanical seal, impeller, fuses for control power, pump motor if applicable and main disconnect, and spare starter
- O&M Manuals - Require three copies of operation and maintenance manuals and manufacturer's parts list, for all equipment, be furnished to the Division of Water Quality prior to final acceptance
- Painting - Paint piping and appurtenances in the valve vaults and wet wells with coal tar epoxy
- Valves - Valves on each non-submersible pump suction pipe and discharge pipe and check valves on each discharge pipe for both submersible and nonsubmersible systems.

- Pipe - Suction pipe shall not be less than 6" diameter and discharge pipe shall not be less than 4" diameter

### **2.2.8 *Checklists***

Checklists to be submitted with the plans are included at the end of Section 2.

## Sanitary Sewer Plans Checklist

- \_\_\_\_\_ 1. Plans are stamped by a Licensed Professional Engineer in the Commonwealth of Kentucky
- \_\_\_\_\_ 2. Flow determinations consistent with Section 4 have been made
- \_\_\_\_\_ 3. The receiving system has the capacity for the proposed flows
- \_\_\_\_\_ 4. All geographical features shown
- \_\_\_\_\_ 5. Topography and elevations of all existing features shown
- \_\_\_\_\_ 6. Topography and elevations of all proposed features shown
- \_\_\_\_\_ 7. Contours at 2 ft. Intervals
- \_\_\_\_\_ 8. Direction of flow in streams indicated
- \_\_\_\_\_ 9. 100-year flood elevation shown
- \_\_\_\_\_ 10. Location, size and direction of existing sewers shown
- \_\_\_\_\_ 11. Location, size and direction of proposed sewers shown
- \_\_\_\_\_ 12. Plan and profile sheets at 1" = 50 ft. horizontal and 1" = 5 ft. vertical
- \_\_\_\_\_ 13. Manhole numbers shown
- \_\_\_\_\_ 14. Manhole stations shown
- \_\_\_\_\_ 15. Deflection angles shown
- \_\_\_\_\_ 16. Coordinates of manholes shown
- \_\_\_\_\_ 17. Distance between manholes, pipe size, and slope shown on each line segment
- \_\_\_\_\_ 18. Elevations confirm to LFUCG datum
- \_\_\_\_\_ 19. Elevations shown at manhole inverts and rims
- \_\_\_\_\_ 20. All existing utilities and structures, above and below ground shown
- \_\_\_\_\_ 21. All easements indicated on plans
- \_\_\_\_\_ 22. All utilities are shown in the easements
- \_\_\_\_\_ 23. Easement widths are consistent with Section 6.9.3 Required Easement Widths
- \_\_\_\_\_ 24. Conflicts (main lines or laterals) with the storm sewer or other utilities
- \_\_\_\_\_ 25. Laterals shown for each lot
- \_\_\_\_\_ 26. 6" laterals shown where required
- \_\_\_\_\_ 27. No collector or trunk sewers are located in storm retention basins or their embankments, or the 10-year flood plain
- \_\_\_\_\_ 28. Hydraulic design criteria of Section 6.4 has been followed including velocities and slopes
- \_\_\_\_\_ 29. Manhole design and location is consistent with section 6.5
- \_\_\_\_\_ 30. Pipeline depth is consistent with Section 6.6
- \_\_\_\_\_ 31. Sewer system integrity requirements of Section 6.7 are met
- \_\_\_\_\_ 32. Legends, vicinity map, north arrows etc. shown

## Pumping Station Plans Checklist

- \_\_\_\_\_ 1. Plans are stamped by a Licensed Professional Engineer in the Commonwealth of Kentucky
- \_\_\_\_\_ 2. Flow determinations consistent with Section 4 have been made
- \_\_\_\_\_ 3. Class of the pumping station is indicated
- \_\_\_\_\_ 4. Design criteria for the class of pumping station are followed
- \_\_\_\_\_ 5. Wet well sizing is consistent with Section 7.3.1
- \_\_\_\_\_ 6. Force main sizing is consistent with 7.3.3
- \_\_\_\_\_ 7. Other factors such as those listed in 7.3.4 have been considered
- \_\_\_\_\_ 8. Pump rate (gpm ) and total dynamic head (TDH) are given
- \_\_\_\_\_ 9. All geographical features shown
- \_\_\_\_\_ 10. Subsurface information, as appropriate, is provided
- \_\_\_\_\_ 11. Topography and elevations of all existing features shown
- \_\_\_\_\_ 12. Topography and elevations of all proposed features shown
- \_\_\_\_\_ 13. Contours at 2 ft. Intervals
- \_\_\_\_\_ 14. Direction of flow in streams indicated
- \_\_\_\_\_ 15. 100-year flood elevation shown
- \_\_\_\_\_ 16. Existing pumping stations, force mains, and trunk sewers within 1 mile radius of the  
proposed pumping station shown
- \_\_\_\_\_ 17. Size, minimum grade of sewer at discharge point of force main is given
- \_\_\_\_\_ 18. Location, size and direction of existing sewers shown
- \_\_\_\_\_ 19. Location, size and direction of proposed sewers shown
- \_\_\_\_\_ 20. Location, size, and direction of existing force mains shown
- \_\_\_\_\_ 21. Location, size, and direction of proposed force main shown
- \_\_\_\_\_ 22. Manhole numbers shown
- \_\_\_\_\_ 23. Manhole stations shown
- \_\_\_\_\_ 24. Deflection angles shown
- \_\_\_\_\_ 25. Coordinates of manholes and pumping station shown
- \_\_\_\_\_ 26. Distance between manholes, pipe size, and slope shown on each line segment
- \_\_\_\_\_ 27. Bench marks are shown
- \_\_\_\_\_ 28. Elevations confirm to LFUCG datum
- \_\_\_\_\_ 29. Elevations shown at manhole inverts and rims
- \_\_\_\_\_ 30. All existing utilities and structures, above and below ground shown
- \_\_\_\_\_ 31. Property lines for the proposed pumping station property are indicated
- \_\_\_\_\_ 32. All easements indicated on plans
- \_\_\_\_\_ 33. All utilities shown in the easements
- \_\_\_\_\_ 34. Legends, vicinity map, north arrows etc. shown
- \_\_\_\_\_ 35. Access roads, parking, turnarounds are shown
- \_\_\_\_\_ 36. Regrade and drainage are shown
- \_\_\_\_\_ 37. Fencing of the site is shown
- \_\_\_\_\_ 38. Landscaping is shown
- \_\_\_\_\_ 39. Plan and section views sufficient to indicate what is to be built and what equipment is to be  
furnished
- \_\_\_\_\_ 40. All equipment to be furnished is on the approved equipment list of the LFUCG
- \_\_\_\_\_ 41. Elevations given for all structural and operational points given
- \_\_\_\_\_ 42. Painting is defined and/or specified
- \_\_\_\_\_ 43. Appropriate details for all misc. items
- \_\_\_\_\_ 44. Telemetry system consistent with 7.4.6 or 7.5.6 to operate with existing LFUCG system